EXHIBIT "G"

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PRELIMINARY REPORT IN THE MATTER OF:
Lindquist vs HEIM, L.P..

By Gary M. Hutter, Ph.D., P.E., C.S.P.
Meridian Engineering & Technology, Inc.
March 8, 2006

INTRODUCTION

Dr. Gary Hutter was retained by the law firm of Meyer, Darragh, Buckler, Bebenek and Eck in October/ November 2004 to assist in the evaluation of an accident to Ms. Linquist involving a foot pedal and lack of point-of-operation safeguarding on a Heim press brake.

Ms. Linquest was employed by Corry Manufacturing, as a machine operator, and on the day of the accident, was assigned by her employer to operate a press brake manufactured in 1978 by the Heim Company (Heim).

The press brake was originally sold to Avco Lycoming in 1978, and came to be purchased used at a later date by Corry Manufacturing (Corry) through a reseller of used equipment. Its intervening ownership and application over the approximately 25 year period (between initial introduction into the stream of commerce, and the date of the accident) is not completely known. Corry fabricated and installed two hand controls on a movable pedestal after they purchased the press as used equipment. This is a substantial addition to the press.

The press brake was initially sold with a "plug in" foot operated control (foot pedal) that could be used to cycle the press. The Heim press brake was sold after the accident and the foot control involved in the accident (which most likely was not originally supplied by Heim) was lost sometime after the press brake was sold by Corry. There are a few photographs of a foot control reportedly in use at the time of the accident, the photographs show some characteristics that are inconsistent with the original foot control, and its exact manufacture cannot be determined based on the photographs. It has been assumed to be a Linemaster product.

The self inflicted injury appears to have occurred when the plaintiff pressed her foot downward on the foot control, while still having her hands within the die (point of operation) on the press brake. There were no mechanical or electrical faults or failures found in the equipment after the accident. There was no "point-of-operation" safeguarding on the press at the time of he accident.

The accident occurred around 1:45 p.m. and was not witnessed by other individuals at the place of employment.

Dr. Hutter viewed the subject press and other presses in 2004 at a used equipment reseller.

QUALIFICATIONS

Dr. Hutter has a bachelor's degree in Mechanical Engineering; a master's degree in Environmental Engineering, and a Ph.D. in an area of safety called "Environmental & Occupational Health Studies". He also has completed the required course work for a master's degree in Human Factors.

Dr. Hutter is an Illinois Registered Professional Engineer. In the State of Illinois, and in many other states in the United States, only Registered Professional Engineers are allowed to offer and provide engineering services to the public and in forensic matters. Meridian Engineering and Technology, Inc., owned by Dr. Hutter, also is an Illinois Registered Professional Engineering Corporation, and a Registered Professional Design Firm. In the State of Illinois, and in many other states in the United States, only Registered Professional Engineering and Professional Design Firms are allowed to offer and provide engineering services to the public and in forensic matters.

Dr. Hutter has worked as a safety engineer/ consultant for both private industry and for governmental regulatory agencies. He has provided consulting services in the area of safety, mechanical, and environmental engineering, and is a Certified Safety Professional (CSP). This certification is a public measure of his qualifications in the area of safety.

Dr. Hutter has taught various engineering and safety courses at the Illinois Institute of Technology (IIT), including courses in industrial hygiene, industrial health and safety, and in OSHA compliance. These courses are all graduate level courses. He has also been a guest lecturer at he University of Illinois and other professional organizations on safety related issues.

For over 20 years, Dr Hutter has been an active committee member of the National Safety Council's committee responsible for machine tools, including press brakes. In 1995 and 1996, Dr. Hutter was Chairman of the "Power Press, Forging and Metal Fabricating Section" of the National Safety Council's committee responsible for promoting metal fabricating machine safety, including the safety of press brakes. He has given and attended numerous seminars concerning metalworking, presses, and press brake safety; and is a cited contributor to two (2) American National Standards Institute (ANSI) publications concerning machine tool operations. One of these included ergonomic (human factors) considerations of machine tool equipment.

In 2005 and 2006, Dr. Hutter has been a cited "contributor" to OSHA on "machine guarding", and is a contributor and reviewer of the National Safety Council's publications "Safeguarding Illustrated"; and the "Power Press Safety Manual." In 2004 some of Dr. Hutter's work on human factors and machine safety was published in the Stamping Journal.

Dr. Hutter's CV is attached.

MATERIALS REVIEWED SPECIFICCALY FOR THIS MATTER

ANSI Standards B11.3 1973, 1982, 2002
ANSI Standards B11.1 1971, 1982
Depositions of: T. Linquist, Gary Dietz, Gary Merkle, Kevin Messinger, Joel Nichols, Jamie Ossa, Jan Oviatt, Dave Phillip, Robert Rooney, A. Muse, Z. Zajdel
Photographs & selected deposition exhibits
Heim manual, drawings, specifications, production documents
OSHA investigation & related documents
Answers to Interrogatories
Response to Production Request
Answers and Objections to Interrogatories/ Production Request
OSHA Standards, OSHA supportive documents, various years
Technical documents/ web materials footnoted or referenced in text
Plaintiff's expert's report and in-text referenced documents
Listings of documents with annotations about safeguarding not causing hazards
Sales literature about presses and foot controls.

REFERENCED DEPOSITION TESTIMONY (paraphrased or quoted)

Plaintiff

Q What is the most number of times you remember applying the foot switch in any one given shift?... Year, your best estimate..
A. I'd say maybe 150 to 300. (pg 51)

Q. How many different parts do you recall making on that particular press brake?
A. ... five or ten different parts. (pg 53)

Q. ... how many parts had you performed that first process on?"
A. Between 150 and 220... (pg 73)

A. ... there were two or three steps before I did the operation that was when I was injured. (pg 60)

A. I'd usually sit for a little bit, then I'd stand to give my legs stretching. It was whatever you were more comfortable with doing. (pg85)

Q .. where would the foot switch be...?
A. ... on the floor by the machine by the right. (pg 86)

Q. Describe the foot switch for me?
A. ... I think it was yellow...

Q. Did it have a covered roof or housing over it?
A. I don't remember, I'm not positive. (pg 87)

Q. Is what is shown in exhibit D the two palm button pedestal that you was somewhere near the press brake..?
A. Yes.(pg 91)

Q.. on the 60 ton press, were you trained on how to use the two palm button switch?
A. That's all there was for it, so yes. (pg 96)

Q. Did you ever read any of the warnings that were located on the press brake?
A. No. (pg 97)

Q. Did you read the operator's machine's manual at any time prior to your accident?
A. No. (pg 103)

Q. .. anything that prevented you from reading it [warning]?
A. No, I just never looked up.. (pg 105)

Q. And then it states, do not operate this machine until you have read and understood the safety and operating rules outlines in an instruction book with the machine.. Did you ever notice this particular plate..?
A. No. (pg 107)

Q. Did you need a warning to tell you to keep your fingers out of the die area..
A. Sounds like common sense. (pg 110)

Q. Are you saying there was both a light curtain and two palm button switch in use when you performed that operation?
A. Yes. (pg 120)

Q. ...agree... Corry in violation of that instructions manual?
A. Yes. (pg 124)

A. I was sitting at the time of the incident. (pg 140)

Q... was your foot inside the foot switch..?
A. It wasn't inside it... (pg 140)

Q... how did the machine operate...?

A I don't know. I don't know if my foot slipped or what it was, but the pedal got hit some how. I don't know how. (pg 141)

Q. Many of the OSHA records from Corry said that your foot was inside the housing, resting on it and that you accidentally bumped it (pg 141)

Q. Do you have any memory of your foot slipping into the foot switch housing?
A. no, I don't know how it happened or anything. (pg 144)

Mr. Gary Dietz Quality Manager at Corry

A). [Key switch allow press operation by palm buttons or foot switch.] (pg 31)

A) … [nothing to prevent operator from reading warnings on machine.] (pg 66)

Q). Heim press brake.. multi-use press…?
A). Yes.. (pg 90/91)

A). I don't know why [Corry performing process in violation of warning on front of machine]. (pg 104)

A). [Root cause of accident] Press brake was not properly set up for operation. (pg 121)

A). [Key switch} was operational at time of accident.(pg 155)

Mr. Gary Merkle (Corry Plant Manager)

A). [the plant does its own machinery maintenance.] (pg 9)

Q). [purchase] in 1999?
A). Yeah. (pg 17)

Q) 70-6 Heim s/n 2176?
A.) Yes

Q). Photo 40 shows operator's manual is contained in a bin fastened on side of the Heim press?
A). Yes. (pg 21)

Q).. warning affixed to the machine prior to the accident?
A) Yes.

Q.. Heim press is a multi-purpose press?
A. Sure. (pg 35)

Q If this warning had been followed, this accident would not have happened?
A. … yeah. (pg 41)

Q Do you "..know .. if machine was purchased.. with a foot switch?
A. …".. I'm not sure." (pg 44)

Mr. Kevin Messinger Maintenance Tech at Corry

A. the foot switch came with the press (pg 25)

Q One particular foot switch could be to any other machine..?
A. Yes.. (pg 28)

Q.. was operator's manual.. on the side of he machine after the accident..?

A. Yes.. (pg 28)

Q. Did you find any defects in the foot switch?
A. No (pg 43)

Mr Joel Nichols Press operator

Q... " was she sitting in her chair?"
A. Yeah. (pg 47)

Ms. Jamie Ossa Component Tech at Corry

Q. How was the Heim press operated?
A. Foot pedal. (pg 32)

Q. Did you know that there was a two-palm button switch?
A. I knew they were there, but I didn't use them. (pg 33)

A) ... several of the other operations, you had to hold the part by the edge.. (pg 35)

Mr Jan Oviatt with Corry in Maint. Dept

A) .. surprised if foot switch is original, looked newer, and had latch with it. (pg 14/15)

A) .. he found no problems with the press after the accident (pg 19/20)

Q... key switch..

A) Only problem I had with that.. it was suppose to be for the set-up person or the supervisor who determined the position [of the key] (pg 24/25)

Q) Where is te key located?
A) .. from what I have seen, in the machine. (pg 39)

Mr. Dave Phillips with Corry Maint. Dept.

A) light curtain at Corry in 1986 (pg 19)

A) standard procedure to have manual available to operators (pg 57)

Mr. R Rooney was with Corry

A) he had run every press there (pg 11)

A) Ms Linquest was sitting in a chair (pg 37)

A) have to fully insert foot to activate (pg 39/40)

Codes, Standards, and Custom & Practice

A press brake, of the type associated with this accident, is one of the most versatile machines in the metal working industry; is most often characterized by a long narrow work surface (compared to power presses); and is typically used for small to medium size production runs.

It is usually considered a multi-purpose machine, typically able to produce long "V" type bends through the use of owner supplied dies. Press brakes are rarely sold with the production dies needed by the ultimate user, and dies are normally selected by the owner/ firm using the press brake. Selection of the dies and work progress form the hazard of the point of operation; and as such, the machine does not have the pinch point that caused the plaintiff's injuries when it left the control of Heim.

In this particular case, Heim had no input or control over the configuration of the point of operation, or over the safeguarding needs; and could not have provided point of operation guarding. Corry had control over this work place and through its management and production stuff, caused the formation of the point of operation, selected and controlled the application and use of cycle controls, selected the safety measures, and had supervisory and training responsibilities for the plaintiff's safety under OSHA. The Occupational Safety and Health Administration also requires the employer to safeguard the point of operation. In this matter, that could never have been the responsibility of Heim; and would have been the responsibility of Corry Manufacturing.

The type of dies, the size and shape of the work piece, and completed finished shape produced by Corry, are the important elements in determining the most appropriate safeguarding features for the operation. ***"A press brake, by itself, must be considered an incomplete machine and only one component in a production system."***[1] As such, safeguarding is the responsibility of the owner. There is no one universal safeguarding that is applicable to a press brake; and it is acknowledged in the safety literature for press brakes that safeguarding of the point of operation is the responsibility of the owner/ employer of the press brake operator. Likewise training and supervision of equipment operators was the responsibility of Corry.

The Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) codes and standards allow for safeguarding of press brakes by the use of a variety of hardware, control configurations, and combinations of administrative and supervisory procedures. Typically these various configurations include light curtains and/ or two hand controls to reduce "point-of-operation" hazards; and are the types of safety devices that Corry had in their workplace for other press operation hazards, or had available specifically for this press brake. Unfortunately, the employer, Corry, chose not to implement the use of the two hand controls associated with this press brake and had not applied light-curtain safety devices to this press brake for this operation.

In the 2001 version of an OSHA document there is approval for the use of a foot control without a front cover. Specifically:

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[1] "Press Brakes," National Safety Council, Data Sheet 419, Rev- 93, pg 1

"Safeguarding Equipment and Protecting Workers from Amputations

Small Business Safety and Health Management Series"

"U.S. Department of Labor Occupational Safety and Health Administration

OSHA 3170
2001 Are Foot Controls Another Option?

Foot controls are not safeguards because they do not keep the operator's hands out of the danger area. If you use them, they will need some type of guard or device, such as barriers or pullouts with interlocks capable of controlling the start up of the machine cycle. Using foot controls may increase productivity, but the freedom of hand movement allowed while the machine is operating increases the risk of a point of operation injury. Foot controls must be guarded to prevent accidental activation by another worker or by falling material and not allow continuous cycling. They work best when the operator is in a sitting position. Always avoid the hazard of riding the pedal (keeping the foot on the pedal while not actively depressing it.) (See properly guarded and positioned foot control in Figure 22.)

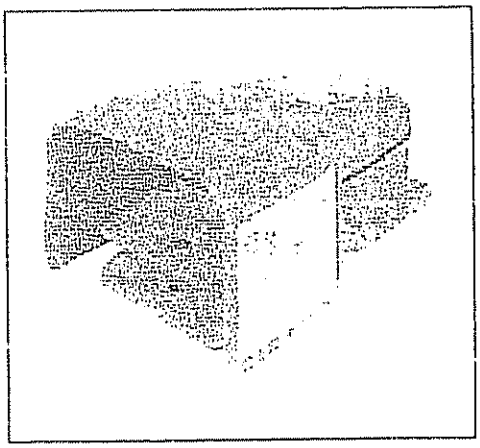

Figure 22. Properly Guarded Foot Control"

(http://www.osha.gov/Publications/OSHA3170/osha3170.html)

OSHA regulates power press brakes under the performance standard at 29 CFR 1910.212.[2] ***"...safeguarding employees from point of operation hazards during power press brake operations***, 29 CFR 1910.212(a)(3)(ii) is the applicable OSHA standard. As you will note, this standard specifies that:

> **"The guarding device shall be in conformity with any appropriate standard therefore, or in the absence of applicable specific standards, shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle."[2]**

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[2] OSHA, Standard Interpretations 11/07/1991 – "Concerning power press brake operations" To: Mr. David J. Bierman Colt Equipment, Inc. From: Patricia K. Clark, Director Directorate of Compliance Programs http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=20452.

"OSHA looks to the American National Standards Institute, Inc. (ANSI) as the publishers of nationally recognized consensus standards for guidance relevant to the requirements of 29 CFR 1910.212(a)(3)(ii). Specifically, ANSI B11.3-1982, Safety Requirements for Construction, Care, and Use of Power Press Brakes, is a pertinent standard for your consideration. In this specific instance, adherence to the specifications and requirements of the ANSI B11.3 standard will ensure compliance with the OSHA regulation at 29 CFR 1910.212(a)(3)(ii). [2] "

Hence, the ANSI B11.3 standard is the document OSHA uses for press brake safety.

ANSI B11.3 1973 (not the 1983 version) was the applicable ANSI standard for this press brake at the time the press entered the stream of commerce. The Heim Company did not sell this press brake to the plaintiff's employer, but sold it approximately 25 years before this accident, in 1979, to a different company.

This OSHA embraced ANSI standard (B11.3) addresses the application of "foot controls", "foot pedals", and "foot-treadle bar" for actuation of a press brake.

Paragraph 3.23 states:

> **"*Foot Control.* A foot control is a foot-operated control mechanism (other than a foot pedal) designed to control the movement of the ram.."**
>
> ***"E 3.23 Foot Control.* This control usually takes the form of an electrical switch that operates a solenoid or solenoid valve. "**

Specifically, illustration 15 shows a foot-control with a pedal-like element inside of a housing consisting of sides and a top cover; but notably missing any front cover or other "foot insertion-prevention" feature. This standard used, as their "example," a similar appearing top and side covered foot control as provided by Heim; and the standard never even mentions a foot control with a front cover as plaintiff's expert suggests.

The standard specifically states:

> **"4.2.4.2.4 *Foot-Control Actuation Prevention.* The foot control shall be protected so as to inhibit accidental actuation by falling or moving objects, or by someone stepping on it. Means shall be provided for manual locking the foot control to inhibit such accidental actuation. "**
>
> **"E 4.2.4.2.4 *Foot-Control Actuation Prevention* One way to preventing or inhibiting accidental actuation of the foot control would be to provide a key-operated selector switch."**

The subject press brake had a foot control that looks surprisingly like that shown in the ANSI B11.3 document, and incorporated exactly the "key-operated" feature referred to in the standard.

The 1973 version of the ANSI B11.3 standard also assigns the safety and / or safeguarding of the point of operation to the employer. Specifically it states:

"6.1 Employer Responsibility

6.1.1 Hazards at the Point of Operation

> **(1) The employer shall make an evaluation of each and every operation before any material is worked (formed, etc) to determine that:**
>
> **(a) How a point-of-operation die guard can be used or**
>
> **(b) How a point-of-operation device can be used, to protect the operator(s) from injury at the point of operation, If a point-of-operation guard or device *can* be used, it *shall* be used."**
>
> **(2) When a point-of-operation die guard or device cannot be used, protection for the operator shall be provided by either:**
>
> **(a) Using hand tools to feed the part, or**
>
> **(b) Maintaining a safe distance between the operator and point of operation, determined by the dimensions of the part being formed."**

In summary, the 1973 version of ANSI B11.3, the version utilized by OSHA at the time the press brake left the control of Heim:

1) allows the exact configuration of the Heim press brake foot control; and never mentions or endorses a foot control with a front cover. The Heim press brake complied with this criteria, and was reasonably safe; and

2) assigns the employer the responsibility for evaluating the operation of the press brake, and to provide appropriate safeguarding. The Heim press brake complied with this criteria, and was reasonably safe. Corry Manufacturing did not comply with this criteria

A review of the next generation of the ANSI B11.3 standard (1982 version) for press brakes also allows for the use of a top and side covered foot control like that reportedly used on the date of the accident. In fact, the illustration (illustration 15) shows a foot control much like the Heim supplied foot control; and it is shown as an example, without any front cover. In fact, nowhere in the entire 1983 version of the ANSI standard, is there any mention of, or recommendation for, a front cover for a foot control. The standard states that;

> **"One way of preventing or inhibiting accidental actuation of the foot control (valve) would be to provide a cover or mechanical locking pin as shown in illustration 25."**

That specific illustration does not depict any type of front cover over the foot control.

Regarding the safeguarding of the point of operation, the 1982 version of the ANSI standards says:

"6.1.4 Safeguarding the Point of Operation

It shall be the responsibility of the employer, after selecting the tooling and specific type of power press brake for producing the piece part, to evaluate that operation before the piece part is worked (bent, etc) and to provide point-of-operation safeguarding according to the provisions of 6.1.4 (1)."

In summary, the 1982 version of ANSI B11.3, the version utilized by OSHA in their letter of interpretation of safety standards applicable to press brakes in 1991;

1) allows the exact configuration of the Heim press brake foot control; and never mentions or endorses a foot control with a front cover. The Heim press brake complied with this criteria, and was reasonably safe, and

2) assigns the employer the responsibility for evaluating the operation of the press brake, and to provide appropriate safeguarding. The Heim press brake complied with this criteria, and was reasonably safe. Corry Manufacturing did not comply with this criteria.

The 1982 version was reaffirmed two times after 1982 (in 1988 and 1994) and the Heim press brake maintained compliance with the above safety requirements through those dates.

In 2002 the ANSI B11.3 standard was revised and allows for a foot control of the type provided by Heim almost 25 years earlier; and continues to assign responsibility for safeguarding the point of operation to the employer. Page 60 (figure 20) of the 2002 ANSI standard shows a foot control that looks like the Heim provided foot control from 25 years previously; and there is no recommendation for or need of a front cover for a foot control.

In summary, the 2002 version of ANSI B11.3, the most current version;

1) allows the exact configuration of the Heim press brake foot control; and never mentions or endorses a foot control with a front cover. The Heim press brake did not violate this criteria, and was reasonably safe; and

2) assigns the employer the responsibility for evaluating the operation of the press brake, and to provide appropriate safeguarding. The Heim press brake did not violate this criteria, and was reasonably safe.

A review of the literature for press brakes, shows that it is obvious that the custom and practice during these years was not to promote or require the use of front covered foot controls for safety in press brakes. Indeed, in a publication by the plaintiff's expert, it is reported that the typical foot switches found in industry are the opened front foot control, not the front covered foot control he now demands in this case. ***" Open-sided and side-shielded foot switches... are typical of the control candidates found in industry. "***[3]

[3] "Foot Control Activation – Reciprocating vs. Pivoting", by R.L. Barnett & P. Barroso Jr., Triodyne Safety Brief, Vol. 14. No. 2, September 1998

Warnings & Manual

The press brake involved in this accident came equipped with several warnings/ labels that provided sufficient information to place the owner and user on notice of the need for both groups (owner & operator) to take steps to safeguard the operator. These included:

1) A warning to not operate the machine unless the operating rules and instruction book had been read and understood.

2) A warning not to place body parts in the die area

3) A warning to never to operate the press unless given instructions and having read and understood the manuals

4) A warning to never operate the press unless proper guarding is applied.

A review of the ANSI B11.3 standard has the same configuration and warnings on their "exemplar" warning sign (Illustration 56, ANSI B11-3, pg 62)

These "on-machine" warnings were sufficient to reasonably safeguard the equipment by labeling against this accident.

The equipment manual from Heim reportedly was with the machine at the time of the accident and it specifically stated that:

1) Proper point of operation safeguarding is a responsibility of the user of the machine.

2) There are providers of various point of operation safeguarding providers.

3) The operator must read and understand the manual.

4) Not to place hands or body parts into the point of operation

5) The operator should notify the proper authority if there are any questionable operations.

6) Guards should be checked.

7) That the operation of the foot control is guarded over the top and should be positioned to a safe location.

8) Palm button controls are available to actuate the press with hands out of the press for this activity.

The instructions in the manual were sufficient to reasonably safeguard the equipment by manual-based information concerning this hazard. The plaintiff's expert appears not to have any criticisms about the warning and instructions.

Safety Engineering/ Design Philosophy

There are several underlying approaches to producing a reasonably safe equipment design. Our societal values for safety are most often defined by our national safety codes and standards. The above section demonstrates that the Heim press brake conformed to those codes and standards, and was reasonably safe.

One of the other safety concepts used in offering add-on safety features is that the application of the add-on safeguard itself should not cause a new or aggravated hazard. The application of a front cover to a foot control for this type of equipment causes a new or aggravated hazard, that of riding the foot control. This behavior (riding the pedal) is identified in the literature as a hazard, and the plaintiff's expert has himself repeated those observations;

> ***"Recently completed research has confirmed what some press manufacturers hypothesized – the mousetrap [front cover] design is unsafe for most punch press operations since it encourages the practice of 'riding the pedal'".***[4]

The plaintiff's expert's firm has published a bibliography and articles addressing the problems of applying safety devices that cause such a new/ or aggravated hazard.[4] It would be inappropriate for the manufacturer of this press to mandate the use of a front cover on a foot control as a means to safeguard the point of operation on this press brake.

Another safety philosophy developed over the years by safety professionals and used in the evaluation of equipment risk minimization is a "safety priority" approach or hierarchy. The plaintiff's expert has copied and repeated this general philosophy in his company's publications[5]. This philosophy would preferably invoke the use of safeguarding in the form of point of operation guarding; not on changing behaviors by placing a front cover on one of the controls. Point of operation safeguarding is a higher priority than training; and hence the foot front cover would be inferior to point of operation safeguarding. In this matter, point of operation safeguarding was not employed by Corry Manufacturing, and Corry Manufacturing's behavior would be in conflict with the plaintiff's expert's prior personal publications.

The use of a front cover over the foot control would result in a configuration that, from a safety perspective, might: help the operator, might do nothing to help the operator, or might hurt the operator. The plaintiff's expert has identified this type of a device as a class V device ("On the Classification of Safeguarding Devices," R Barnett, P Barroso Jr., Triodyne Safety Brief, V.1 N.1 Reprint, April 1981). His publications indicate that type V devices should not automatically be placed on equipment by equipment manufacturers. Again, if Heim had placed a foot control with a front cover on this press, they would have been in conflict with the plaintiff's expert's prior personal positions.

A forth safety philosophy, occasionally offered in the literature, is the concept that there may be a certain important dependency on safety devices that can also lead to additional

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[4] "Philosophical Aspects of Dangerous Safety Systems", R Barnett & B Hamilton,, Triodyne Safety Brief, V 1 N 4 Reprint, December 1982

[5] "Safety Hierarchy", R Barnett & D. Brickman, Triodyne Safety Brief, V 3, n 2, June 1985

accidents. The plaintiff's expert has used this concept in some of his personal publications[6]. In the application of a front cover to a foot control as the means to safeguard the point of operation, there would be a significant violation of that philosophy. One cannot, and should not, "depend" solely on a foot control for their safety on a press brake with an un-safeguarded point of operation hazard.

Additionally, there is some enhanced "hazard communication" to an operator in the use of this machine, wherein the sheer operation of the machine "informs" the operator of the presence of a potential hazard at the point of operation. The plaintiff in this matter acknowledges that she knew of the hazard at the point of operation and knew that riding or unintended actuation of the foot control could cause the machine to cycle and could injure her. The plaintiff's expert states in one of his publications:

"The Doctrine of Manifest Danger is that protocol advocated by designers for causing a machine or system to communicate to users that its safety has been compromised before an injury occurs." [7]

Operation of this press brake would instantly communicate to an operator of the hazards of an un-safeguarded point of operation. The Heim design would be in compliance with this general philosophy, and the recommendation of the plaintiff's expert.

In the deposition of one of the Corry set-up personal, it is indicated that all other presses at the plant utilized light curtains and/ or two hand controls. The plaintiff's expert has ignored his own "compatibility hypothesis"[8] in his criticisms of this product; wherein he indicates there is a need for a certain consistency of machines within a single work area to reduce accidents. Had this employer equally applied the use of two hand controls and/ or light curtains to the subject machine, the "compatibility hypothesis" would have been achieved, and this accident most likely would not have occurred. Corry Manufacturing violated the plaintiff's experts own safety concept.

Indeed, numerous books on workplace safety, and the Occupational Safety and Health Administration place the primary responsibility for worker safety on the employer (e.g., "Basics of Safety & Health", National Safety Council, N Tompkins, 2001; " Occupational Safety & Health, Goetsch, 2nd Edition, 1996; "Safety Management", 5th Edition, Grimaldi & Simonds, 1993;"Occupational Safety Management and Engineering", Hammer, 4th Edition, 1989/ 2nd edition 1981). In this matter the safety of the point of operation is to be provided by the employer, and often includes the use of light curtains and/ or two hand controls. The hazard in this particular installation is not the method of machine actuation; it is the lack of point of operation safeguarding, lack of training, lack of supervision, and lack of compliance with warnings and instructions. This need to safeguard the point of operation by the employer is further highlighted in the PA-OSHA Consultation Program Report. Specifically they stated:

"Hazard type: Serious

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[6] " Dependency Hypothesis", R Barnett, et. al., Triodyne Safet Brief, v. 2 n.3, reprint, November 1983
[7] "The Doctrine of Manifest Danger", R Barnett, Triodyne Safety Brief, v. 8 n 1 September 1992
[8] "Principles f Human Safety", R Barnett and B Switalski, Triodyne Safety Brief v.5 n 1 February 1988

> **Condition: The employer did not provide and/ or did not ensure use of a "point-of-operation guard" or properly applied and adjusted point-of-operation device on an operation performed on a hydraulic press."** [9]

There is nothing in that analysis and report about a defect or deficiency in the foot control.

Additionally, numerous publications acknowledge the desirability of foot controls as an option for machine control. None of these publications state that a foot control needs a front cover to be reasonably safe (e.g., "Safety Engineering", Marshall, 2nd Edition, ASSE, 1994; "Human Factors in Engineering and Design", Sanders, 5th & 7th Edition, 1993, 1982; "Ergonomic Design for People at Work", Eastman Kodak Company, V 1, 1983).

Additional Comments Concerning Plaintiff's Expert Report

It appears to be a major premise of the plaintiff's expert report that Linemaster first published the availability of a front covered foot control in May of 1977 and that Heim should have selected it for distribution in a product sold in April 1978. The report's discussion and documentation supports the fact that Linemaster continued to make available foot control without a front cover at the time of the accident; and Linemaster continues to this date to offer foot controls without front covers.

Linemaster never promoted the front covered foot control for a press brake of this type, and to this date does not in anyway suggest and/ or restrict the sales of covered or un-front-covered foot switches for press brakes. Linemaster does not take the position in their catalog that foot controls without a front cover do not comply with OSHA criteria. Indeed, the Linemaster catalog indicates that **"properly installed 'Point of Operation' and 'Pinch Point' guards, or devices, are required on the machine."** [10]

The new availability of a product does not mean other products, not incorporating that newly available product, is defective. Certainly seat belts and airbag were "available" years before they became standard features in automobiles. There is no "retroactive" nature or requirement of the application of a front cover foot control to a press brake.

In paragraph 1 of section V of the plaintiff's report he states:

> **"This document [ANSI B 11.3 -1973] is the first ANSI standard developed specifically for press brakes. As such, it only addressed mechanical foot pedals."**

He has either misrepresented the content of the standard or is mis-implying that the foot control involved in this accident may not have been addressed in this standard, but that is incorrect. The standard then, and through to the current standard, acknowledges the use of a "foot control" as an acceptable means of controlling the cycling of the press brake, and allows for the use of "electrical switch(es)" in that configuration.

---

[9] September 16, 2002 letter to Gary Merkle from John Engler Re: PA-OSHA report
[10] "Linemaster," American Foot Switch Leader, catalog 1979, Woodstock, Ct, 1979.

Further he refers to a locking pin on a foot control to inhibit actuation, but seems not to be aware that the machine had a key-operated selector switch for the foot control and other control circuits to inhibit actuation; which is in total compliance with the standard. In addition, the subject foot switch referred to in the plaintiff's report required dual actuation motions; as it incorporated a latch trip lever.

Additionally, the plaintiff's expert claims an **".. undepressed foot pedals are elevation of 5 to 7 inches above the floor surface."** (Section V, paragraph 7, page 6) is the intent or limitation of ANSI B11-3, 1973 . Nowhere in that standard does it provide those dimensions, and Illustration 15 looks remarkably like modern foot controls that do not have their actuation surface anywhere near to the 5 to 7 inches that he suggests. To further support this inconsistency in the plaintiff's report, the 1982 version of the ANSI standard uses a line drawing of a foot control (illustration 58) that shows the actuation surface of the foot control, within close proximity of the mounting surface. Even the plaintiff's Linemaster catalog shows foot controls that have an actuating surface in close proximity to the floor, and not 5 to 7 inches above floor level; and perform at low foot force levels. Human Factors handbooks have rejected the high activation forces of the old foot pedals the plaintiff's expert is referring to as better than modern foot controls.

In his final "summary" of that section of the report, the plaintiff's expert states:

> **"Every one of these features [high activation forces, high positioning, high activation forces and restricted locations] were radically compromised by the introduction of electric foot controls."**

The industry of manufacturers of foot controls, the huge sector of users of equipment outfitted with foot controls, OSHA, and ANSI have all embraced the use of electric foot switches of the type with only side and a top covers, and they have become the custom and practice in our country. The plaintiff's expert acknowledges in his own person publication that **"With the advent of ergonomics, operator comfort, performance and convenience were addressed and the modern foot control emerged."** [11]. He has never promoted the return to the old mechanical pedal with high force levels and other ergonomic shortfalls in any of his personal publications; nor has he taken the position in his personal publications that a foot control of the type involved in this matter is unreasonably dangerous. In addition, he does not address the dual motion design configuration of this foot control with the latch trip lever feature in his report as a means to limit accidental actuation. That particular control configuration requires deep foot penetration and two motions to actuate the foot control. Such a design inhibits accidental actuation.

In a later section of the plaintiff's report there is an incomplete discussion of some "human factors" investigation into the use of a foot control. This testing is highly speculative as to the performance of the subject foot control and the accident parameters; and the results of that investigation is non-productive in evaluating this accident.

On its surface, the accidental activation rate of about 90% reported by this plaintiff expert just does not seem to, in any way, represent reality. If there were a real 90% mis-

[11] "Foot Controls: Riding the Pedal", R Barnett, Triodyne Safety Brief, V 12, N 4, July 1997.

actuation rate, there would be so many ruined machines, so many damaged parts, and so many injuries; this would rise to the level of a national disaster. The industry, the code writers and enforcement agencies, and industry in general does not report this type of mis-actuation rate; and hence the reasonableness of the entire testing is questionable.

A review of the description of the plaintiff's expert's testing implies that the testing may have been performed using non-machine tool operators as subjects. This would be like using non-drivers in a behind the wheel diving skills test; and would invalidate this test as representative of the accident conditions. My expectation is that the subjects were employees of the plaintiff's expert or students of the plaintiff's expert. Such subjects could be highly influenced by the employer-employee and/ or teacher-student relationships. These relationships could easily cause biased results in this pseudo-testing.

The subjects were not operating a press brake with the foot control, but rather were operating a light with a foot control. The actuation of a light with no injury consequences for the subject is an entirely different condition than a recognized consequence of finger injury or loss on a die equipped press brake. This missing aspect would invalidate the utility of this pseudo-testing in determining the likelihood of accidental actuation.

According to the description of the testing, the subjects were "requested" to put their feet in certain positions "**... so that balance could be maintained .**" This would imply that the test subjects were standing, and standing not in a position that they selected, but one defined by the tester. In the subject accident, the injured party was not standing, but sitting at the time of the injury, and she had complete control over where and how she positioned her feet. These differences would also invalidate these pseudo-test results.

The report indicates that the subjects were asked to:

> **"...move forward without looking at the footswitch or intending to activate the foot switch."**

In the subject accident, the plaintiff was not instructed to move her foot while her hands were in a compromised position; and she could have easily looked to see where her foot and the foot control were. These "instructional" differences alone would invalidate the utility of these pseudo-tests in this matter.

Finally the tests were not performed using a foot control with a latch trip lever. This trip lever requires deep penetration into the foot control housing, and two motions for actuation. This missing test feature further invalidates these results as being representative of the accident conditions.

The plaintiff's expert bases his conclusion that a front cover on the foot control would have prevented this accident on his pseudo-testing and his "reasonable foreseeable operating profile." (pg.7 para.7). While this testing itself is flawed to the point where it is inappropriate to allow any safety professional to come to this conclusion; this plaintiff's expert conclusion also ignores other important accident facts and conditions detailed below.

1) First, it is reasonable for a press brake manufacturer to expect that owners/ operators of press brakes will use the appropriate safeguarding. It is required by codes, it is required by OSHA mandatory regulations, it is discussed in the equipment manual and on the machine, and this employer utilized it on other press machines at this plant. Had this safeguarding been in place, this accident would not have occurred.

2) There is no foreseeability of events between the plaintiff's expert's test scenario and the conditions of this accident.

3) The plaintiff's expert states that "**it is axiomatic [self-evident] in Safety Engineering that every safety device or system will eventually degrade**" . After over 25 years of service, without a current maintenance crew/ supervisory staff concerned about the safety of this press, even a front-covered foot switch could have failed. The potential mechanical/ electrical failure of an unevaluated foot control and resultant accident is predicted by (foreseeable) the plaintiff's expert's "Dependency Hypothesis" and "Manifest Danger" concepts. Effectively, Corry Manufacturing's staff should have been inspecting this foot control, and the press itself on a regular basis, as workers will depend on them to a certain degree for their safety. The need and performance of such inspections should have been reasonable to expect of an employer.

4) Designers do not design "in" one hazard to try to eliminate another hazard. The plaintiff's expert notes that well recognized safety and design concept in his personal publications.

In the last paragraph of section VI the plaintiff's expert mentions that

> **"When the operator places a part into the die, it is necessary to reach forward, and/ or step forward to promote the activity. Unfortunately it is this forward motion that gives rise to accidental actuation of the unguarded switch at the very time that the hands are in jeopardy."**

There is no reason to conclude there is foot movement during part placement. In the pseudo-testing by plaintiff's expert, the subjects were asked to move their foot forward without looking, it was not a voluntary foot movement resulting from part placement. If one assumes there is foot movement accompanying part placement; then with a front-cover foot switch, and the resulting "foot pedal riding" induced by such a design, there would just as likely be an accidental actuation. It must also be remembered that the referenced foot switch also had a latch trip lever that required deep foot penetration into the foot control housing and two movements to actuate the foot pedal (if it was not being "ridden" by the operator). Finally, with regards to an operator's need to have their hands in the point of operation for positioning, the codes and standards, and the general safety literature recommend that hands stay out of the point of operation and that tools be used for part placement. The ANSI standard that has been referred to contains examples of these devices for part placement/ retrieval. This employer could have provided tools for part placement to further enhance safety.

In paragraph 2 under section VII, the plaintiff's expert states

"In 1973, at the time B11.3 was written, almost no press brakes were equipped with point of operation devices. "

He provides no basis for this statement; but it is irrelevant, as the accident occurred in 2003, and there were almost 25 years for "point-of-operation" safeguarding development available to be applied to this press. Also, the 1973 standard identified, among other point of operation safety devices, the use of "two-hand control devises" and "presence-sensing devices" as possible mean of providing safety from this hazard. Both of these types of devices were generally available and in use for this type of equipment in 1973. Based on a review of a 1976 copy of "Best's Safety Directory", Oldwick, N.J., it is recommended that two hand controls be used for safeguarding, but they also state that;

"Press brakes should have foot controls for use on those jobs where the size of the stock being processed requires an operator to hold it in position."

In paragraph VIII (Accidental Activation) the plaintiff's expert seems to have forgotten his own reported research that indicates that with front guarded foot controls:

"Riding the pedal: One foot is continually poised above or just touching the pedal until a machine stroke is required. The foot then depresses the foot pedal eventually returning to its position above the pedal. It is never withdrawn from the foot control. "Riding the pedal" is analogous to a hunter "Keeping his finger on the trigger." When a power press operator, for example, keeps a foot deployed over a pedal, accidental activation may occur during episodes involving sneezing, reaching forward, slipping, a tired foot or being bumped forward. "Riding the pedal" is the most prevalent cause of accidental activation of power presses."[12]

Plaintiff's expert has also forgotten to include the body of research that states that the addition of a safety device that causes a new hazard or aggravates an existing hazard should not be used. A front cover is such a device.

In section IX of the plaintiff's report, he states that "Hands Out of Dies" (HOOD) was part of the 1973 ANSI standard, but was rescinded as an OSHA requirement; but ignores that the concept that HOOD is a goal for press operations since the mid 1970's through this date. Specifically OSHA directives state:

"1. Purpose

This directive provides a guide to aid in the recognition of mechanical power presses' point of operation hazards and uniform clarifications of definitions, guards, develop and methods of safeguarding.....

3. Background

a. On December 3, 1974, the final amendments to 29 CFR 1910.217 were published in the Federal Register, Volume 39, Number 233. The detailed

[12] "Foot Control Activation.. ibid

statement of reasons preceding the amendments noted that while the previous "no hands in die" ruling had as its goal the elimination of any need for an operator to ever have his hands in the point of operation. that requirement alone did not result in hazard-free operation. The installation of redundant guards and devices as backup safeties were not judged to significantly improve safety. Moreover, questions of technological and economic infeasibility were raised. While it is believed that "no hands in die" should continue to be an industry goal, the determination was made to reveal the absolute "no hands in die" requirement in favor of improving the utilization of a single means of press safeguarding. For most operations, adequate protection can be afforded, by a single guard or guarding device as long as that means of protection is properly designed, installed, maintained, and, most importantly, used under supervision. From an enforcement standpoint, employer adherence to each of these elements of a press guarding program in the workplace takes on increased importance. "

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=1727

In short, while OSHA demands safeguarding press brakes, and endorses the use of open front foot control, they have not abandoned the goal of "hands out of dies"; and it is not reasonably foreseeable that an owner of a press brake would allow workplace conditions that could result in this type of accident with hands in dies part placement.

CONCLUSIONS

1) The press brake did not have a point of operation hazard when it left the control of Heim.

2) Corry Manufacturing installed dies and configured the controls that caused there to be a point of operation hazard that the plaintiff was exposed to.

3) When Corry Manufacturing caused there to be a point of operation hazard, it was their responsibility to provide appropriate safeguarding, appropriate operator training, tools, and appropriate supervision. Corry Manufacturing did not provide those items, and the lack of these items was causal in this accident.

4) Corry Manufacturing had appropriate types of safeguarding on other presses at their plant, and therefore knew of the need for and availability of such safeguarding.

5) Heim could not provide point of operation safeguarding for the point of operation hazard present at the time of this accident, had no responsibility for training of the plaintiff, and certainly could not be expected to supervise the plaintiff.

6) The Heim press brake complied with all of the requirements of OSHA and ANSI with regard to the accident conditions when it left the control of Heim.

7) The Heim press brake as configured and operated by Corry Manufacturing was not in compliance with OSHA codes or ANSI standards. Had the press been configured as required by OSHA and ANSI, this accident would not have happened.

8) Press brake safeguarding devices were readily available at the time of this accident

9) The press brake operated for almost 25 years without a recorded accident of this type.

10) Others made significant modifications to the Heim press brake before this accident by installing moveable two hand controls.

11) The Heim press brake had adequate warnings on it and in its manual, and these warnings were almost exact duplicates of the warnings offered by ANSI as good examples of warnings.

12) The press brake owner and operator did not follow the instructions and warning in the manual and on the press. Had they followed these instructions and warnings this accident would not have happened.

13) The Heim supplied foot control was appropriate for the press when it left the control of Heim, and that same type of foot control, without a front cover, is endorsed and used as a good example in both OSHA and ANSI publications through the twenty-first century. The presence of this foot control is not the cause of this accident.

14) The Heim foot control is allowed by OSHA and ANSI codes, standards, and discussion; and is commonly available and found in such industrial applications. The manufacturer of this foot control does not restrict its use with press brakes and does inform users that point of operation guarding may be needed.

15) The testing offered by the plaintiff's expert are flawed in numerous ways, including: using non-representative test subjects, eliminating the potential hazard from the test method, "directing" the subjects on foot movement, having undo influence on test subjects, using a "balance" positioning not consistent with the accident conditions, and using a foot control that lacked a critical element from the accident foot control.

16) Corry Manufacturing actually used press safeguarding devices on other presses that could have been applied to the subject press, and had a two hand control for this particular press that could have been used to safeguard the point of operation.

17) OSHA representatives did not issue citations because of any problems/ faults with the foot control, but did issue citations to the facility operator because of inadequacies in the point of operation safeguarding.

18) The foot control design the plaintiff's expert is demanding, one with a front cover, is in conflict with his own reported research and publications.

19) The foot control design the plaintiff's expert is demanding, one with a front cover, is in conflict with the plaintiff's personal publications concerning the inappropriateness of using that technology without regulatory demand.

20) The foot control design the plaintiff's expert is demanding, one with a front cover, is in conflict with the personal publications of the plaintiff's expert on issues of: safety hierarchy, dependence, and the use of safeguards that create or aggravate hazards.

21) The concept of "hands out of dies" that the plaintiff's expert disparages in his report, is still embraced by OSHA and other safety organizations as a very desirable goal in the use of press equipment.

22) It would not be reasonably foreseeable that an employer would: violate the criteria of OSHA and ANSI; would knowingly safeguard other machines in their plant and not apply similar safeguards to this machine; would ignore the warnings and instructions in the manual and on the machine; would not properly train and supervise their employee; and would configure the operation to have hands in die without other safeguarding.

23) It would not be foreseeable that an operator of a piece of equipment of this type would not follow the labeling on the press; not follow the instructions in the manual; and not seek advice and clarification about her tasks from her employer.

24) There was nothing deficient, defective, or unreasonably dangerous in Heim providing a foot control of the type offered with this press brake.

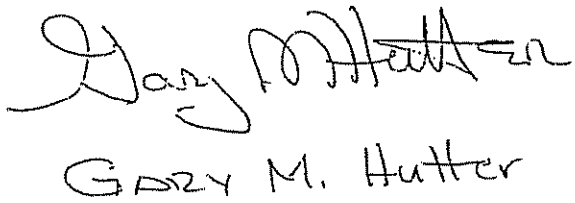

EXHIBIT "H"

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March 13, 2006

Mr. Paul R. Robinson
Meyer Darragh Buckler Bebeneck & Eck
U.S. Steel Tower – Suite 4850
600 Grant Street
Pittsburgh, PA 15219

Re: Lindquist, Tina v. Heim, L.P.
Your file no.: ALFA-107530

Dear Mr. Robinson:

In accordance with your request, I have completed my review of the documents provided by your office and summarize my opinions and conclusions relative to the foot control provided by Heim for use with the Mechanical Press Brake involved in Tina Lindquist's accident on September 25, 2002.

Documents Reviewed

1. Complaint in Civil Action
2. OSHA Investigation file
3. Instructions and Parts Book for Heim Mechanical Press Brakes
4. Sales documentation for the Heim Press Brake
5. Corry Manufacturing Accident report file
6. Deposition testimony
    a. Tina Lindquist, taken on June 28, 2005
    b. Gary Dietz, taken on July 21, 2005
    c. Gary Merkle, taken on July 21, 2005
    d. Kevin Messinger, taken on July 21, 2005
    e. Jan Oviatt, taken on July 22, 2005
    f. Dave Phillips, taken on July 22, 2005
    g. Joel Nichols, taken on July 22, 2005
    h. Anthony Mase, Jr., taken on July 27, 2005
    i. Robert Rooney, taken on September 8, 2005
    j. Jamie Ossa, taken on September 8, 2005
    k. Zygmund Zajdel, taken on January 23, 2006

7. Post-accident photographs and videotape of the Heim Press Brake and tooling
8. Interrogatories and Responses
9. Document Production Requests
10. PA-OSHA Consultation Program file
11. PMA Insurance claims notes
12. Codes and Standards
    a. Safety Requirements for Power Press Brakes, ANSI B11.3- 1973, 1982 and 2002
    b. Safety Requirements for Mechanical Power Presses, ANSI B11.1-1971 and 1982
13. Linemaster Switch Corp.
    a. current product literature
    b. patent no. 2,957,960
14. Safety Literature
    a. Philosophical Aspects of Dangerous Safety Systems; Barnett and Hamilton; December, 1982
    b. Safeguard Evaluation Protocol; Barnett and Schmid; May, 1995
    c. Foot Controls – Riding the Pedal; Barnett; July, 1997
    d. Foot Control Activation – Reciprocating vs. Pivoting; Barnett and Barroso; September, 1998
    e. Safeguarding Workers and Protecting Workers from Amputations; U.S. Department of Labor, OSHA 3170, 2001

Accident Description

On the day of the accident, Tina Lindquist was employed at Corry Manufacturing in Corry, Pennsylvania as a press operator. She was assigned to operate the Heim power press brake, model 70-6, serial no. 2176, using a hands-in-die parts feeding and removal procedure. The press brake was equipped with a dual hand control as well as an electric foot control. The operating method was selected through the use of a supervisory key lock selector switch mounted on the dual hand control pedestal. The foot control activation method was selected and in use at the time of the injury.

Ms. Lindquist indicated she was not aware the dual hand control was available for use on the subject press brake nor was she trained to avoid reaching into the point of operation of the press. She stated she was specifically instructed to reach into the point of operation region to pre-form the workpiece around a mandrel before actuating the foot control. Indeed, reaching into the point of operation region was the only way to introduce the work into the tooling of the press.

Ms. Lindquist had a chair available to her while operating the press brake and was found seated on the chair following the accident. From her operating position at the chair, Ms. Lindquist was able to reach into the press. The foot control was positioned on the floor in front of her to the right such that she was able to access it from her operating position using her right foot.

While hand forming the workpiece on the mandrel, Ms. Lindquist activated the foot control causing the press brake to cycle and crushing her fingers.

Foot Control Identification

It is understood that the foot switch control in use at the time of Mrs. Lindquist's accident was lost or disposed of following the sale of the Heim press brake by Corry Manufacturing after the accident.

According to the file documentation, the foot control originally supplied with the Heim press brake cannot be determined. However, it appears that the foot control in use at the time of the accident had a Linemaster Hercules Full Shield protecting the pedal from the top and both sides. The Full Shield is clearly shown in several photographs taken after the accident occurred. However, it is unclear whether the foot control shown in the post-accident photographs is a Linemaster product. To my knowledge, Linemaster Hercules pedals and shields, regardless of style, were painted orange. The pedal depicted beneath the shield in the photographs appears to be black.

Dave Phillips, a witness employed in Corry Manufacturing's maintenance department, indicated there are different colors of foot switches in use at Corry. There were black foot switches for the alloy machines and orange ones for the presses:

Phillips, pg. 92 to 93:

Q. Are there any other different colors of foot switches in place at Corry?
A. For certain machines, yes.
Q. What other colors are there?
A. There's little black ones for like alloy machines.
Q. How about for the presses?
A. They're all orange.

Hence, it is inconclusive whether the foot control assembly depicted in the photographs is a genuine Linemaster product or, perhaps, a hybrid of two different foot switch products.

On the other hand, Corry witnesses as well as the report prepared by Barnett and Ulmenstine identify a foot control equipped with a maintained latch mechanism. This feature requires full insertion of the users foot into the pedal housing to push the latch forward with the toe before the pedal can be depressed. Linemaster patented this feature in 1960 and, to my knowledge, manufactures the only foot switch with this safety feature. This foot control, currently called the "Hercules Anti-Trip Footswitch Full Shield Model"[1] is intended to help prevent accidental actuation.

Acceptance of the Model 532-SWH Foot Control in Safety Standards

The first safety standard that specifically addressed mechanical power press brakes was adopted in 1973, revised in 1982, reaffirmed twice, and revised again in 2002. The standard is identified as ANSI B11.3, *American National Standard for Machine Tools – Power Press Brakes – Safety Requirements for Construction, Care, and Use.*

In the report authored by Barnett and Ulmenstine, the claim is made that ANSI B11.3-1973 "is the first ANSI standard developed for press brakes. As such, it only addressed mechanical foot pedals." This claim is not accurate.

Not only does the standard recognize both mechanical and electric foot operating means, it provides terminology to distinguish each type. Note the published definitions of "Foot Control" and "Foot Pedal" in the 1973 standard[2]:

> *3.23 Foot Control.* A foot control is the foot-operated control mechanism (other than foot pedal) designed to control the movement of the ram on mechanical, hydraulic, or special-purpose power press brakes.
>
> *E3.23 Foot Control.* This control usually takes the form of an electrical switch that operates a solenoid or solenoid valve.
>
> *3.24 Foot Pedal.* A foot pedal is the foot-operated lever designed to operate the mechanical linkage that directly engages the clutch and disengages the brake on a mechanical power press brake while the pedal is held depressed.

The 1973 safety standard required that the foot control be protected against inadvertent actuation[3]:

> 4.3.4.3 *Foot Control.* A foot control, if used, shall be protected so as to inhibit accidental actuation by falling or moving objects, or by someone stepping on it.

A guard covering the top of the pedal pad was sufficient to comply with this requirement. Note that the code committee addressed the hazard of accidental actuation by using the language "stepping on" the pedal rather than "stepping into the pedal." Note that the only foot control illustration in the 1973 safety standard (Illustration 15)[4] shows an open front pedal design.

A foot control equipped with a top and side guarding arrangement, the equivalent to Linemaster's "Full Shield," is illustrated in the 1982[5] and 2002[6] revisions of the ANSI B11.3 safety standard.

A Linemaster "Full Shield" foot control is illustrated in the U.S. Department of Labor publication OSHA 3170, *Safeguarding Workers and Protecting Workers from Amputations.*[7] The foot control has no front lift gate and the illustration is captioned, "Properly Guarded Foot Control." Equally significant is the statement:

> "Foot controls must be guarded to prevent accidental activation by another worker or by falling material and not allow continuous cycling. They work best when the operator is in a sitting position. Always avoid the hazard of riding the pedal (keeping the foot on the pedal while not actively depressing it.)"

Note that OSHA does not require the foot control to prevent accidental activation by the foot control user, but rather "by another worker." It is correctly recognized that since the intended use of this control involves the user depressing the pedal, it is not possible to prevent the same person from inadvertently stepping into it.

The foot control involved in Ms. Lindquist's accident had two additional features to protect against inadvertent actuation of the pedal. The pedal was equipped with side guards as well as a toe latch feature that required the operator to fully insert their foot into the pedal guard and push a toe latch rearward before the pedal could be depressed. This safety feature exceeds any requirement for protection against inadvertent actuation expressed by any safety standard, past or present.

The 2002 safety standard for press brakes additionally recognizes the hazard associated with unattended actuation of the foot operating means. The supervisory key lock switch on the operator's control pedestal fulfills this requirement. When the press brake is unattended, the foot control can be disabled by turning the key in the control pedestal and removing it from the selector.

The Modern Foot Control vs. the Mechanical Foot Pedal

As Barnett and Ulmenstine point out in their report, the mechanical foot pedal of years past is characterized by locations close to the bed of the press, large activation resistance, and large pedal movements.

The modern foot control in use at the time of the accident was tethered on a long cord estimated to be 10 to 12 ft in length. This enables the foot control to be located at a "Safe Distance" from the press. In other words, if the press is utilized with no other point of operation guarding, the foot control can be located sufficiently far from the hazard that the press operator cannot reach the hazard from the operating position. In the case of a press

brake, the long cord also enables the foot control to be utilized while handling large work pieces that prevent the operator from being positioned near the bed of the press. The older style of mechanical foot pedal cannot accommodate this need.

The large activation resistance and pedal height associated with the mechanical foot pedal restricts the use of this device to standing operators. Balancing on one foot is required when activating a control of this nature, not to mention the operator fatigue associated with multiple activations over many hours of press brake work. As OSHA 3170 has correctly pointed out, the electric foot control works best when the operator is in a sitting position. The sitting position all but eliminates the problem of balancing oneself on one foot and reduces the physical fatigue associated with high pedal activation forces and large pedal movements. The electric foot control can also be utilized by a standing as well as a seated operator. It is simply a more versatile control means.

There are acceptable applications for both the electric foot control as well as the mechanical foot pedal. Only the press user is capable of making an appropriate decision regarding which style of control is the best and safest to use for a given production run.

Neither the mechanical foot pedal nor the electric foot control were adequate, by themselves, to satisfy the power press brake safety standard given the tooling and operating arrangement chosen by Corry Manufacturing at the time of Ms. Lindquist's injury. Additional point of operation guarding was needed, and required, to adequately protect Ms. Lindquist.

Foot Switch Utilized at the Time of the Accident

In their report, Barnett and Ulmenstine make reference to the footswitch in use at the time of the accident. They describe a Linemaster product

> "...constructed with an antitrip treadle mechanism, a latch that requires a certain foot insertion into the switch to depress the pedal."

This product could not have been the Linemaster Model 532-SWH originally supplied with the Heim press since the 532-SWH was not equipped with the antitrip treadle mechanism and latch trip lever. The Model 532-SWH was protected with a Full Shield covering the top and both sides of the treadle only. Indeed, according to Heim engineering drawing A-470-D, the anti-trip foot controls with latch trip lever (Linemaster Models 511-B2 and 511-B4) were not utilized by Heim until after November 9, 1982, four years after the date of manufacture of the product involved in the accident.

The Proposed Front-Gated Foot Control

Plaintiff's experts, Barnett and Ulmenstine, have proposed that a foot control with a front gate be utilized in an effort to avoid inadvertent tripping of the foot control.

Although research conducted on foot controls concludes that a front gate further reduces the probability of an inadvertent foot insertion, the same research also demonstrates that a critical undesirable "side effect" is created by the presence of the lift gate. In his July, 1997 publication, *Foot Controls: Riding the Pedal*[8], Barnett writes:

> "...manufacturers have introduced a variety of concepts for minimizing inadvertent activation arising from 'stepping contact.' For example, top barrier guards, side shields, pedal locks, and front gates are used in various combinations. Unfortunately, as the intervention strategies become increasingly successful preventing 'stepping contact,' the foot control becomes more prone to the really insidious problem of 'riding the pedal.'"

In another publication by Barnett and Hamilton, *Philosophical Aspects of Dangerous Safety Systems*[9], December, 1982, the authors use a front-gated foot control as an example of a dangerous safety system. Originally intended to address the hazard of inadvertent foot switch actuation, the front gate resulted in encouraging the practice of riding the pedal due to the added difficulty of inserting one's foot into the pedal. In an effort to compensate for the difficulty associated with inserting one's foot into the pedal housing, the user simply held the front gate open continuously with the foot thereby riding the pedal at those times when the foot should otherwise be removed entirely from the foot control. Barnett and Hamilton wrote[9]:

> "Recently completed research has confirmed what some press manufacturers hypothesized – the mousetrap design is unsafe for most punch press operations since it encourages the practice of 'riding the pedal'"

When a safety system offers an accident hazard potential of its own, there is unequivocal agreement in the safety literature against the use of the safety system. This safety philosophy is highlighted in the December, 1982 publication by Barnett and Hamilton. For example, the National Safety Council wrote in 1975[9]:

> "It is a cardinal rule that safeguarding one hazard should not create an additional hazard."
> [Handbook of Occupational Safety and Health]

Numerous other safety organizations and publication authors have written similar admonitions including:

- Occupational Safety Management and Engineering, Willie Hammer, 1981
- Concepts and Techniques of Machine Guarding, OSHA 3067, 1980
- Motor Operated Appliances, UL 73, Underwriters Laboratories, 1978

- Accident Prevention Manual for Training Programs, American Technical Society, 1975
- Code of Practice: Safeguarding of Machinery, British Standards Institution, 1975
- Machine Guarding, National Safety News, 1971
- General Requirements for All Machines, 29 CFR 1910.212(a)(2), OSHA, 1971
- Supervisors' Safety Manual, National Safety Council, 1970
- Industrial Safety, 3rd ed., Roland P. Blake, 1963
- Guards Illustrated, 1st ed., National Safety Council, 1962
- The Principals and Techniques of Mechanical Guarding, Bureau of Labor Statistics No. 197, U.S. Dept. of Labor, 1959
- Safety Manual for the Graphic Arts Industry, National Safety Council, 1953
- Model Code of Safety Regulations for Industrial Establishments for the Guidance of Governments and Industry, International Labour Office, 1949
- Mechanical Power transmission Apparatus, National Safety Council, 1949
- American Safety Standard Code for Power Presses and Foot and Hand Presses, ANSI B11.1-1948, American National Standards Institute, 1948
- Accident Prevention Manual for Industrial Operations, 1st ed., National Safety Council, 1946
- Occupational Accident Prevention, Judson and Brown, 1944
- Safety Subjects, Bulletin 67 of Division of Labor Standards, U.S. Dept. of Labor, 1944
- Foremanship and Safety, Macmillan, 1943
- Practical Safety Methods and Devices, Cowee, 1916

The undersigned was both a participant and proctor in the foot switch experiments conducted by Barnett in reaching the above-stated conclusion regarding the "riding the pedal" problem.

In February, 1988, Barnett and the undersigned co-authored a publication entitled, *Principles of Human Safety*[10]. The philosophical problem of how to treat safety devices which have a downside is considered. Individual designers and manufacturers should not adopt safety devices that create a new hazard. In those instances when a downside exists with the use of a safety device, a value system (for example, the judicial value system, safety standards committee, etc.) must weigh the upside and downside effect of the particular safeguarding system. If the upside effects are sufficiently compelling, permission is granted to use the safeguard. It is acceptable for an educated consensus group (value system) to make a decision about the use of a safety system that includes a downside, but it is not acceptable for an individual person or individual manufacturer to make a decision of this nature.

The seatbelt is a classic example of a safety device that includes downside effects which has been adopted by a value system and is required on all modern automobiles. The Food and Drug Administration is a classic example of a value system that routinely approves products that involve adverse side effects when the positive effects are judged to sufficiently outweigh the negative side effects.

No value system, i.e. no safety code or standard committee, to date, has made a judgment, recommendation or requirement that foot controls must include a front gate. Clearly, using the method outlined above for evaluating the proposed front gate for foot controls, the safety device must be rejected by an individual designer or product manufacturer due to the new hazard introduced (i.e. riding the pedal and the associated potential for inadvertent control actuation).

Further Evaluation of the Proposed Front Gate

In May, 1995, Barnett and Schmid published a paper entitled, *Safeguard Evaluation Protocol – A decision Tree for Standardizing, Optionalizing, Prohibiting, Ignoring, Enhancing, or Characterizing Safeguards*[11]. The publication describes a protocol developed for assessing whether a candidate safeguard should be prohibited. Barnett and Schmid wrote:

> "This decision making process intellectually disposes of the judicial position that a manufacturer has a nondelegable duty to include safety devices with his machines. It further challenges the advocacy pronouncement that 'safety should not be optional.'"

Utilizing the Machine Supplier Safeguard Decision Tree described in the paper, the proposed safety feature is the front gate for a foot switch control. Next, it is noted that there is no Value System Approval for the proposed safeguard. Next the proposed safeguard must be classified with regard to helping, hurting and/or doing nothing. The foot control gate either helps (reduces the probability of inadvertent pedal actuations) or hurts (increases the potential for riding the pedal thereby increasing the probability of inadvertent actuation).

The decision tree is abundantly clear. The proposed safeguard must not be used.

Conclusions and Opinions

1. The Linemaster Hercules foot control exceeded the safety requirements of the governing safety standard, ANSI B11.3-1973 at the time the accident occurred. In addition to the top guard protecting the pedal from the required hazard of inadvertent actuation from falling objects or stepping onto the pedal, the Linemaster foot control was also equipped with side guards and a toe latch feature. The side guards and toe latch features further decrease the probability of inadvertent pedal actuation.

2. It is not possible to prevent someone from inadvertently stepping into the pedal when the intended use of the pedal involves stepping into it. This holds true for the proposed front gate. Its use is not a guarantee that an inadvertent actuation will not or cannot occur.

3. A top guard alone adequately addresses the ANSI B11.3 requirement of preventing inadvertent actuation due to stepping onto the pedal.

4. A foot control with top and side guard is illustrated in both the 1982 and 2002 revisions of the power press brake safety standard. This style of foot control is acceptable for selection by a reasonable machine tool manufacturer. Heim's choice of foot control, i.e. covered on the top and both sides) exceeded what was considered reasonably safe by the B11.3 safety code committee. The foot control in use at the time of the accident, i.e. with top and side guards and toe latch feature further exceeded the code requirement for protection against inadvertent actuation.

5. The addition of a lift gate onto the front of a foot control does not eliminate the probability of inadvertent actuation of the pedal.

6. The teathered cord feature of the electric foot control allows it to be utilized at a "Safe Distance" from the point of operation. It also allows for its use by a seated operator. The older mechanical foot pedal does not share either of these features. In addition, the electric foot control significantly reduces operator fatigue due to lower actuation forces and reduction of the need to stand balanced on one leg when compared to the older mechanical foot pedal.

7. The work being conducted by Ms. Lindquist at the time of her injury was compatible with either a mechanical foot pedal or an electric foot control. However, neither style of foot actuating means alone was adequate to protect Ms. Lindquist from the point of operation. Corry Manufacturing should have selected a two-hand control device of provided additional barrier guarding to prevent Ms. Lindquist from accessing the point of operation during the press brake operating cycle.

8. The anti-trip Linemaster footswitch product with latch trip lever in use at the time the accident occurred could not have been the foot control product supplied by Heim with the press brake in 1978. Heim did not begin to utilize the foot control with latch trip lever until late in 1982.

9. According to foot control research conducted by Barnett, the addition of a lift gate onto the front of a foot control creates a new hazard by encouraging the user to ride the pedal thereby increasing the potential for inadvertent actuation.

10. An individual manufacturer such as Heim has a responsibility to reject safeguards which create new hazards such as the proposed lift gate on a foot control.

11. There is unequivocal agreement in the safety literature against the use of safeguards that create a new hazard.

12. No value system has weighed the upside and downside effects of the proposed foot control lift gate and found the upside effects to be sufficiently compelling to grant permission to use the safeguard or to make its use mandatory.

13. Utilizing the *Safeguard Evaluation Protocol* published by Barnett and Schmid, the proposed lift gate feature for foot controls must be rejected.

14. The presence of a lift gate on a foot control has no effect on the misuse of riding the pedal since an operator who is committing this unsafe act has already bypassed the lift gate through failing to remove the foot after each pedal actuation. There is no foot control or foot pedal design that prevents the misuse of riding-the-pedal.

15. The foot control in use at the time of Ms. Lindquist's accident was reasonably safe for its intended use on the Heim press brake.

All of my opinions outlined above are stated to within a reasonable degree of engineering and scientific certainty.

Future Consulting Activities

The undersigned reserves the right to amend this report in the event additional information becomes available. For example, it is anticipated that a copy of the videotaped foot control testing by Barnett and Ulmenstine will be supplied. Commentary and opinions regarding this information will be forthcoming after the tests are reviewed.

Very truly yours
Switalski Engineering Inc.

William G. Switalski

William G. Switalski, P.E.
Mechanical Engineering Safety & Design Consultant

EXHIBIT "I"

CLOUTIER CONSULTING SERVICES, LLC

March 15, 2006

Mr. Paul R. Robinson, Esq.
Meyer Darragh Buckler Bebenek & Eck, P.L.L.C.
U.S. Steel Tower, Suite 4850
600 Grant Street
Pittsburgh PA 15219

Re: Tina Lindquist v. Heim, L.P.
Case No: 04-249E
D/A 9/25/02
Your File: ALFA-107530

Dear Mr. Robinson:

In response to your request, I provide this report relative to my findings concerning an occurrence involving Ms. Tina Lindquist, while operating a mechanical press brake in the normal course of her employment at Corry Manufacturing, Corry, Pennsylvania. This letter will provide my background knowledge of this occurrence which has been obtained from reviewing documents provided by your office, knowledge obtained from working more than 30 years in the machine tool industry, and referencing appropriate government regulations and industry standards relative to the activity taking place and the equipment in use at the time.

Document Review
I have reviewed the following documents, which I received from your office on March 2nd, in preparation of this report.

- Deposition transcript of Tina Lindquist-Ossa (06/28/05);
- Deposition transcript of Gary Dietz (07/21/05)
- Deposition transcript of Gary Merkle (07/21/05)
- Deposition transcript of Kevin Messinger (07/21/05)
- Deposition transcript of Joel Nichols (07/22/05)
- Deposition transcript of Jamie Ossa (09/08/05)
- Deposition transcript of Jan Oviatt (07/22/05)
- Deposition transcript of Dave Phillips (07/22/05)
- Deposition transcript of Robert Rooney (09/08/05)
- Deposition of Zygmund Zajdel (01/23/06)
- Deposition of Anthony Mase (07/27/05)
- Exhibits for all depositions
- Heim's Answers and Objections to Plaintiff's Interrogatories (03/18/05)Heim's Responses and Objections to Plaintiff's Request for Production of Documents (03/18/05)
- Plaintiff's Answers and Objections to Interrogatories and Request for Production of Documents directed to the Plaintiff (06/03/05)

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- Heim's Answers to Plaintiff's 2nd Interrogatories and Request for Production of Documents (10/06/05)
- Defendant's Response to Plaintiff's 1st Request for Admissions (12/13/05)
- Defendant's Response to Plaintiff's 3rd Request for Production of Documents (12/13/05)
- Defendant's Response to Plaintiff's 2nd Request for Admissions, 3rd Set of Interrogatories, and 4th Request for Production of Documents (12/13/05)
- Heim's Supplemental Answers to Plaintiff's 2nd Interrogatories and Request for Production of Documents (12/15/05)
- Material provided in response to subpoena upon PA-OSHA Consulting Program (Indiana University of Pennsylvania)
- PMA Insurance claim notes referencing accident information (PMACNSL 0104-0105)
- Complaint in Civil Action
- OSHA Investigative file
- Instructions and Parts Book for Heim Mechanical Press Brakes (PLTF 0107-0150)
- Sales Documentation
- Corry Manufacturing Company internal Accident Report, including e-mails regarding individual statements (PMACNSL 0076-0080)
- Information received from Hildebrand regarding Heim Press Brake
- Photographs of Heim press brake taken by Mr. Gary Hutter, P.E.
- Photographs of Heim press brake taken at Corry Manufacturing Company by Plaintiff's council
- Expert report of Ralph L. Barnett and Matthew J. Ulmenstine dated 02/13/06
- DVD of machine inspection conducted by Gary Hutter

In addition to the above documents, I referenced the following documents:

- ANSI B11.1 – 1971
- ANSI B11.1 – 1982
- ANSI B11.3 – 1973
- ANSI B11.3 – 1982(R1994)
- ANSI B11.3 – 2002
- Triodyne Inc. Safety Brief Vol. 14, No. 2
- Triodyne Inc. Safety Brief Vol. 12, No. 4
- National Safety Council Accident Prevention Manual 12th Edition
- National Safety Council Power Press Safety Manual 4th Edition
- National Safety Council Data Sheet # 419 – Press Brakes
- OSHA Regulation 29CFR1910.217
- OSHA Regulation 29CFR 1910.212

Heim Special Duty Press Brake

Ms. Lindquist was operating a special duty mechanical press brake manufactured by Heim Corporation, Frankfort Illinois. The subject machine is a Model 70-6, Serial number 2176. It was originally sold to H-B Machinery Company, Hartford Connecticut in 1978. The press brake was shipped to H-B Machinery's customer, Avco Lycoming, Stratford, Connecticut on 9/18/78. A foot control, in the form of an electric foot switch, was supplied with the machine.

Avco Lycoming subsequently sold the machine and eventually it ended up at the facilities of Corry Manufacturing after that company bought it at a machinery auction. Shortly after taking possession of the press brake, Corry designed, manufactured and installed a pedestal mounted dual palm button operator station which incorporated all the machine control features including mode selection, operator control selection, motor start and stop buttons, actuating palm buttons and other controls and indicator lights.

The Occurrence involving Tina Lindquist

On September 25, 2002, Tina Lindquist was assigned to operate the 70-6 Heim press brake The part to be formed started as a flat rectangle of perforated stainless steel, and was to be formed into a cylinder The forming job requires four different set ups of the press brake. Two pre-bends and a "butterfly" operation had been completed on the part and the set up had been changed so the round cylinder forming could be completed. Approximately 200 parts were being formed.

Forming of the cylindrical shape required the operator to manually pre-form the part around a mandrel. This pre-forming was accomplished on the actual mandrel which served as the lower half of the forming die set while it was position in the machine. Therefore it was necessary for Ms. Lindquist to place her hands between the upper and lower die to fit the part around the mandrel.

The press break was set up by Corry employee, Robert Rooney. Mr. Rooney would change dies for each of the four operations on the part after the operator completed each previous operation on the entire lot. With the final die set in the machine to make the round shape, the distance between the upper and lower die components is estimated to be approximately 2 1/4". This is the space within which the operator had to place the part and pre-form it around the mandrel (with her hands).

Ms. Lindquist was positioned in front of the press brake with the tray of parts to her side. She had positioned the foot switch operator control between her and the front of the machine. A stool was positioned behind her. The testimony is unclear relative to weather she was sitting on the stool or leaning against it It is not clear if Ms. Lindquist was inserting, manually forming or removing a part, but during the time her hands were between the dies, the machine cycled down upon them which resulted in the injuries which form the basis of this lawsuit.

Ms. Lindquist testifies she did not actuate the footswitch. An inspection of the machine immediately following the occurrence indicated the machine was operating properly in all respects. Other Corry employees testified that Ms. Lindquist had to be "riding" the footswitch and inadvertently depressed the actuating pedal as her body position shifted forward as she was reaching into the die area.

Standards and Regulations

The American National Standards Institute (ANSI) is a private organization that is in the business of providing procedures and governance for the development of national consensus standards. ANSI seeks out and authorizes other organizations that have special interests in the development of standards for a particular industry or purpose. ANSI appoints Standard Developing Organizations (SDO) who assumes the responsibility of developing standards for

the industry they serve. These SDO's have to follow ANSI rules and procedures in order to maintain their status as an ANSI authorized SDO. ANSI performs regular audits to ensure compliance to their rules.

The Association For Manufacturing Technology is the SDO for machine tool safety standards in the United Stated. Formerly known as the National Machine Tools Builders Association (NMTBA), this organization assumed SDO responsibilities for machine tool safety standards in 1969 or early 1970. There are currently 24 B11 machine tool safety standards. Each one applies to a specific machine type or machine safeguarding. B11.3 – 1973, is the safety standard for Power Press Brakes It was originally approved as an ANSI standard on February 15, 1973. It has had several revisions since that time. The current revision was approved on February 14, 2002.

Another safety standard which has been identified in the material reviewed for this report is ANSI B11.1 – 1971. This standard was originally approved by ANSI on February 17, 1971 and it applies to Mechanical Power Presses. Although Power Presses and Power Press Brakes are both metal forming machine tools, there exist significant differences in the operation and safety aspects of these machines to justify two different safety standards. The requirements in ANSI B11.1 should not be confused or intermingled with the safety requirements found in B11.3 for Power Press Brakes.

The ANSI B11.3-1973 Press Brake safety standard establishes the responsibility for the construction, care and use of these machines. Safety requirements for Construction (design and manufacture) are assigned to the machine manufacturer (supplier). Safety requirements for Care and Use (operation and maintenance) are assigned to the user of the machine. Language in Section 6 of this standard establishes the user's requirements to safeguard the point of operation of press brakes. The point of operation is the area between the upper and lower dies where forming takes place. Presence Sensing Devices (PSD) and Two Hand Control Devices are two of the six types of safeguards described in section 6 of ANSI B11.3 - 1973. This section also mandates the employer to complete within three years of the approval of the standard a program to procure new dies and/or modify existing dies in order to make it unnecessary for operators to place their hands in the point of operation while operating a press brake. This requirement has become known as the "Hands Out Of Die" principle. These same requirements are also in the B11.3 – 1982(R1994) standard that was in circulation at the time of the occurrence to Ms. Lindquist.

The Occupational Safety and Health Administration was established in 1970 when congress passed the William Steiger Act. OSHA was directed to develop laws that would improve safety in the factories and other workplaces in the United States. OSHA regulations are identified by their Code of Federal Regulation number. Title 29 applies to Labor, and part 1910 is Occupational Safety and Health. The section of the regulation applying to General Requirements for all machines is 212. There is no specific regulation in the OSH Act pertaining to the safety of press brakes. Therefore 29 CFR 1910.212 is the regulation general industry has to follow for safeguarding machinery, unless there exists another section of the regulation specific to a machine type. As a matter of fact, 1910.212 is the section under which Corry Manufacturing was cited by OSHA following the occurrence to Ms. Lindquist. The citation was for the employer failing to provide proper safeguarding at the point of operation of the Heim press brake at the time of the occurrence.

Evaluation

The ANSI B11 3-1973 safety standard provided the first authoritative document written on press brake safety. The document was developed by individuals representing manufacturers and users of press brakes, and reflects the custom and practice of the industry at the time of approval in 1973. As mentioned above, the document included strong language addressing "Hands Out Of Die" (HOOD) operation. The industry felt strongly back then, and still does today that if press brakes are operated in this manner, no injuries, or very few injuries will occur at the point of operation This language is found on safety signs mounted on press brakes through out the industry. It is found in machine manuals and the Accident Prevention Manual published by the National Safety Council. Data Sheet # 419 from the National Safety Council echoes the same philosophy. To suggest that HOOD is ineffective is a discredit to the many safety professionals, designers and die builders who have worked to this end over the past 30 years. The data gathered by the Bureau of Labor Statistics show the effectiveness of HOOD with the continually decreasing hand and finger injury rates over the past 20 years.

The dissertation provided by plaintiff's expert concerning HOOD completely misstates the historical facts The reality is the ANSI B11.1-1971 safety standard contained language on HOOD. OSHA's adoption of the B11 1-1971standard into its regulation included the requirement for HOOD operations and made it Federal Law, (rather than a requirement in a voluntary consensus safety standard). The metal stamping industry, which consists primarily of power press users, filed suit against OSHA demanding that the HOOD requirement be removed from the regulation. The suit cited the extreme economic damage the requirement would bring upon the industry because of the tens of thousands of power press dies that would have to be modified or redesigned/remanufactured, which translated into millions of dollars, in order to comply with the law. Obviously the industry won and OSHA modified the requirement in the regulation. The committee revising the B11.1 safety standard in 1982 acted to keep the standard consistent with its sibling OSHA regulation. It should be noted, the B11.1 safety standard continued to urge the use of HOOD even after its 1982 revision.

The facts of this case require us to return to the discussion of press brakes. Ms. Lindquist was not injured while operating a power press. The Heim press brake Ms. Lindquist was operating was originally manufactured in 1978. At some point between the time the machine was delivered to Avco Lycoming, the original user, and its use at Corry Manufacturing on September 25, 2002 a palm button station, mounted on a pedestal, had been installed on the machine by Corry Manufacturing maintenance personnel.

The original machine met all the construction requirements of the ANSI B11.3-1973 standard. The evidence shows that a footswitch was provided with the machine in 1978. There is no evidence to indicate what make or model foot switch was provided at that time. Plaintiff's expert assumes a Linemaster Cat # 532-SWH was the originally provided foot switch. However, the footswitch on the Heim press brake at the time of the occurrence in 2002 was a Cat. # 511. Also, the evidence does not give us any indication if the original user, Avco Lycoming, utilized the originally provided foot switch or added its own, or installed a palm button station or other control device on the press brake when incorporating it into its production operations.

Foot controls are widely utilized throughout the metal fabricating industry. In 1978 there was no requirement in the press brake standard, or any other safety standard that required an electrical foot switch to have a gate, or flap over its opening. Additionally, experience has shown that foot switches that are difficult to access encourage "riding" of the foot control. A

Triodyne Inc Safety Brief in 1997 examined 12 different types/styles of footswitch and did not find significant safety advantage among the test specimens.

The function of the foot control is to provide the operator of the press brake with a means to control the motion of the ram when it is necessary to have the hands available to control the part that is being formed. Point of operation safeguarding is required at all times when operating a press brake in production operations, and a foot switch is not a point of operation safeguarding device unless it is permanently fixed at a distance far enough away from the point of operation that an operator cannot reach this area and still cycle the machine. This is an impractical requirement for all but the rarest press brake applications.

A dual palm button control requires the simultaneous actuation of two push buttons by both hands in order to initiate machine motion. The buttons are usually located approximately 27" apart to prevent "bridging" by using the elbow and the finger tips of the same arm. Dual palm buttons can be utilized as a point of operation safeguarding device when properly located relative to the point of operation. The location is a function of the stopping ability of the machine. The subject machine was equipped with a dual palm button station which could have been utilized as a point of operation safeguarding device for the forming operation Ms. Lindquist was performing. All that was required was for Mr. Rooney, or Ms. Lindquist to move the palm button station into position and select "Hand" using the key operated selector switch located on the pedestal station itself.

Another type of point of operation safeguarding device which could have been utilized on this press brake and incorporated into the forming process being performed by Ms Lindquist is the presence sensing device (PSD). The machine was not equipped with such a device at the time of the occurrence, but one was ordered and installed shortly thereafter. Additionally, there is testimony in the depositions reviewed that there was an unused PSD in the maintenance department at Corry Manufacturing at the time. The testimony of the Corry employees has indicated the Heim press brake continues to be operated today with the PSD in place and operating, and the operator utilizing the duel palm button control to cycle the machine.

Conclusion

Based upon my education and training in the machine tool industry, the experience from working in the metal fabricating industry for more than 33 years with 24 of those years directly related to the safe operation and use of machinery, having fulfilled the requirements and testing to earn the designation of Certified Safety Professional, and with a reasonable degree of certainty, I provide the following opinions.

The Heim 70 – 6 mechanical press brake, manufactured in 1978 was not defective. The footswitch, as a component of the metal forming system on the day of the occurrence was not defective. There are no safety standards against which to measure footswitches, and there is continuous debate within the safety community regarding the efficiency of the various designs commonly found throughout the manufacturing world. The Triodyne Safety Brief Vol. 12 No. 4 "Foot Controls: Riding the Pedal" concludes with this statement: IV. 9. "The proper selection of a foot control is not straightforward. It involves many considerations including knowledge of operator movement in the work space, steadiness requirements for part insertion, the use of point of operation safeguards, technology transfer, maximum or continuous stroke rate of the controlled machine, and the various anticipated uses of the foot control on multi-mode machinery." In 1978, when Heim selected the footswitch that was originally provided with the

press brake, there is no possible way they would be able to foresee any of the above considerations outlined in the above Safety Brief conclusion.

It is universally recognized that the users of power press brakes are in the best position to determine the correct type of point of operation safeguarding for the variety of work they perform on these machines on any given day. It is normal for a press brake set up to be changed several times a shift. The job Ms. Lindquist was performing required 4 different set ups within a couple of hours. Each set up may have required unique safeguarding, or adjustment to existing safeguarding. Point of operation safeguarding is required for all press brake production operations. The OSHA law and the American National Safety Standard both require some form of safeguarding. Unless the footswitch is permanently fixed at a sufficient distance away from the point of operation, the footswitch with or without a front flap, is not a recognized safeguarding device in the ANSI standard.

A duel palm button operator station could have provided the necessary safeguarding. The accident would not have happened had the palm button station that was already on the machine been moved into position and turned on by Mr. Rooney when he set the dies up, or by Ms. Lindquist before she started the forth operation. Additionally, the accident would not have happened had a PSD been ordered and installed on the press break the same time the palm button station was manufactured and installed by Corry Manufacturing maintenance personnel, and then turned on and used on September 25, 2002.

The press brake was not being properly used at the time of the occurrence. The requirement to reach into the die area to hand form a part around a mandrel is a misuse of this machine. The procedure established by the employer required the operator to place both her hands in a very high risk area. Procedures should have provided for the hand forming to be performed outside the point of operation on a secondary mandrel so it would be unnecessary to reach between the dies.

I have prepared this report based on the materials reviewed as outlined at its beginning. I reserve the opportunity to modify or add to my opinions herein should additional information become available.

If you have any questions or require additional information, please do not hesitate to contact me.

Very Truly Yours,
Cloutier Consulting Services

Dennis R. Cloutier CSP

Dennis R. Cloutier CSP
President